

AMENDMENTS TO THE CLAIMS

Listing of Claims:

1. (Currently amended) An isolated nucleic acid comprising a nucleotide sequence which encodes for polypeptides having Δ-4-desaturase activity, selected from the group consisting of:
 - a) of a nucleic acid the nucleotide sequence having the sequence as depicted in SEQ ID NO: 1,
 - b) nucleic acid sequences which, as a result of the degeneracy of the genetic code, can be derived from the coding sequence comprised in SEQ ID NO: 1,
 - c) derivates of the nucleic acid sequence depicted in SEQ ID NO: 1, a nucleotide sequence which codes for a polypeptide[[s]] having the amino acid sequence[[s]] depicted in of SEQ ID NO: 2, and
 - c) or a nucleic acid a nucleotide sequence which codes for a polypeptide having at least 40% 95% homology at the amino acid level with SEQ ID NO: 2 and having a Δ-4 desaturase activity.
2. (Currently amended) The isolated nucleic acid sequence according to of claim 1, wherein the sequence is derived from a plant.
3. (Currently amended) The isolated nucleic acid sequence according to of claim 1, wherein the sequence is derived from the class of Euglenophyceae.
4. (Withdrawn) An amino acid sequence which is encoded by an isolated nucleic acid sequence according to claim 1.
5. (Currently amended) A gene construct comprising an the isolated nucleic acid according to of claim 1, wherein the nucleic acid is functionally connected to one or more regulatory signals.
6. (Currently amended) The gene construct according to of claim 5, wherein the nucleic acid gene construct comprises additional biosynthesis genes of fatty acid or lipid metabolism selected from the group consisting of acyl-CoA dehydrogenase(s), acyl-ACP [= acyl carrier protein] desaturase(s), acyl-ACP thioesterase(s), fatty acid acyltransferase(s), acyl-

CoA:lysophospholipid acyltransferase(s), fatty acid synthase(s), fatty acid hydroxylase(s), acetyl-coenzyme A carboxylase(s), acyl-coenzyme A oxidase(s), fatty acid desaturase(s), fatty acid acetylenases, lipoxygenases, triacylglycerol lipases, allene oxide synthases, hydroperoxide lyases ~~or,~~ and fatty acid elongase(s).

7. (Currently amended) The gene construct ~~according to~~ of claim 5, wherein the nucleic acid ~~gene~~ construct comprises additional biosynthesis genes of fatty acid or lipid metabolism selected from the group consisting of Δ-4-desaturase, Δ-5-desaturase, Δ-6-desaturase, Δ-8-desaturase, Δ-9-desaturase, Δ-12-desaturase, Δ-5-elongase, Δ-6-elongase ~~or,~~ and Δ-9-elongase.

8. (Currently amended) A vector comprising [[a]] ~~the~~ nucleic acid ~~of~~ according to claim 1.

9. (Currently amended) A transgenic nonhuman organism comprising at least one nucleic acid ~~of~~ according to claim 1.

10. (Currently amended) The transgenic nonhuman organism ~~according to~~ of claim 8, wherein the organism is a microorganism, a nonhuman animal, or a plant.

11. (Currently amended) The transgenic nonhuman organism ~~according to~~ of claim 9, wherein the organism is a plant.

12. (Currently amended) A process for producing polyunsaturated fatty acids, ~~wherein the process comprises culturing comprising growing~~ a transgenic organism which comprises [[a]] ~~the~~ nucleic acid ~~of~~ according to claim 1 encoding a Δ-4-desaturase which specifically desaturates ω-3-fatty-acids, producing polyunsaturated fatty acids in said organism, and recovering the polyunsaturated fatty acids.

13. (Currently amended) The process ~~according to~~ of claim 12, wherein docosahexaenoic acid is produced in the process.

14. (Currently amended) The process ~~according to~~ of claim 12, wherein the polyunsaturated fatty acids ~~molecules~~ are isolated from the organism in the form of an oil, lipid or a free fatty acid.

15. (Currently amended) The process ~~according to~~ of claim 12, wherein the organism is a microorganism, a nonhuman animal, or a plant.

16. (Currently amended) The process according to of claim 12, wherein the organism is a transgenic plant.
17. (Withdrawn) An oil, lipids or fatty acids or a fraction thereof produced by the process according to claim 14.
18. (Withdrawn) An oil, lipid or fatty acid composition which comprises polyunsaturated fatty acids produced by a process according to claim 12 and is derived from transgenic plants.
19. (Withdrawn) An animal feed, human foods, cosmetics or pharmaceuticals, which contains the oil, lipids or fatty acids according to claim 17.
20. (Withdrawn) An animal feed, human foods, cosmetics or pharmaceuticals, which contains the oil, lipids or fatty acids composition according to claim 18.
21. (New) The isolated nucleic acid of claim 1, wherein the polypeptide encoded by the nucleotide sequence has Δ -4-desaturase activity.